

In the Claims

1. (Currently Amended) An apparatus comprising a latch circuit which includes:
first and second resonant tunneling devices coupled in series with each other between
first and second nodes; and

a reset portion coupled to said first and second nodes, said reset portion including a
photodiode portion which is responsive to varying photonic energy for switching between
first and second states which are different, wherein when said photodiode portion is in said
first state said reset portion normalizes a voltage across each of said resonant tunneling
devices;

wherein said first and second resonant tunneling devices are resonant tunneling diodes
which are substantially identical to each other;

wherein said photodiode portion includes a photodiode coupled between said first and
second nodes, said photodiode being conductive in said first state of said photodiode portion,
and being substantially nonconductive in said second state of said photodiode portion;

a first terminal to which is applied a first voltage, and a second terminal to which is
applied a second voltage less than said first voltage; and

wherein said reset portion includes a first resistive element coupled between said first
terminal and a first end of said photodiode, a first capacitive element coupled between said
first node and said first end of said photodiode, a second resistive element coupled between
said second terminal and a second end of said photodiode, and a second capacitive element
coupled between said second node and said second end of said photodiode.

2. (Cancelled)

3. (Currently Amended) An apparatus according to Claim 1 ~~Claim 2~~, including:
a latch input terminal coupled to a third node disposed between said first and first and
second resonant tunneling diodes; and
a latch output terminal coupled to said third node.

4. (Currently Amended) An apparatus according to Claim 2 ~~Claim 3~~, including a resistive element, said input terminal being coupled to said third node through said resistive element.

5. (Currently Amended) An apparatus according to Claim 1 ~~Claim 2~~, including:
a first bias terminal to which is applied a first bias voltage;
a second bias terminal to which is applied a second bias voltage different from said first bias voltage;
a first resistive element coupled between said first bias terminal and said first node;
and
a second resistive element coupled between said second bias terminal and said second node.

6. (Original) An apparatus according to Claim 5,
wherein said first and second resistive elements have substantially the same resistive characteristic; and
wherein one of said first and second bias voltages is a positive voltage, and the other thereof is a negative voltage substantially equal and opposite in magnitude to said positive voltage.

7. (Cancelled)

8. (Cancelled)

9. (Currently Amended) An apparatus according to Claim 1 ~~Claim 2~~, wherein said photodiode portion includes first and second photodiodes which are each coupled to a respective one of said first and second nodes, each of said photodiodes being conductive in said first state of said photodiode portion, and being substantially nonconductive in said second state of said photodiode portion.

10. (Original) An apparatus according to Claim 9,
including a first terminal to which is applied a first voltage, and a second terminal to which is applied a second voltage less than said first voltage, said first and second photodiodes each having a first end which is coupled to a respective one of said first and second terminals, and having a second end; and

wherein said reset portion includes a first resistive element having one end coupled to said second end of said first photodiode and having a further end coupled to a third voltage which is between said first and second voltages, a second resistive element having one end coupled to said second end of said second photodiode and having a further end coupled to the third voltage, a first capacitive element coupled between said first node and said second end of said first photodiode, and a second capacitive element coupled between said second node and said second end of said second photodiode.

11. (Currently Amended) A method of operating a latch circuit having first and second resonant tunneling devices coupled in series with each other between first and second nodes, and a reset portion coupled to said first and second nodes, including:

configuring said reset portion to include a photodiode portion which is responsive to varying photonic energy for switching between first and second states that are different; and

causing said photodiode portion to normalize a voltage across each of said resonant tunneling devices when said reset portion is in said first state; -

selecting first and second resonant tunneling diodes which are substantially identical to each other to serve as said first and second resonant tunneling devices; and

configuring said photodiode portion to include first and second photodiodes which are each coupled to a respective one of said first and second nodes, each of said photodiodes being conductive in said first state of said photodiode portion, and being substantially nonconductive in said second state of said photodiode portion.

12. (Cancelled)

13. (Currently Amended) A method according to Claim 11 ~~Claim 12~~, including configuring said photodiode portion to include a photodiode coupled between said first and second nodes, said photodiode being conductive in said first state of said photodiode portion, and being substantially nonconductive in said second state of said photodiode portion.

14. (Cancelled)